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Docket: 0756-1363

excimer laser light, an ArF excimer laser light and a XeF laser light.--

REMARKS

This amendment responds to the Official Action mailed March 6, 1996.

Filed concurrently herewith is a Request for a One Month Extension of Time which extends the shortened statutory period of response to July 8, 1996. Accordingly, applicant respectfully submits that this response is being timely filed.

Claim 1 was pending in the present application. In this submission, claim 1 has been amended in order to more clearly define protection to which applicant is entitled, and new claims 2-18 are submitted for examination on the merits. Accordingly, claims 1-18 are now pending in the present application and, for the reasons set forth below, are believed to be in condition for allowance.

SUMMARY OF THE INVENTION

The present invention is directed to a method of manufacturing a crystalline semiconductor film which is not oriented along a (111) plane having higher electrical characteristics and higher reliability. More particularly, the method includes the steps of forming a silicon semiconductor film in contact with a silicon nitride film, forming a continuous layer of a catalyst material for promoting crystallization of silicon onto at least a portion of the semiconductor film, heating the semiconductor film with the continuous layer being in contact with the portion of the semiconductor film to crystallize a region of the semiconductor film around the portion, and irradiating the semiconductor film

with light with the catalyst being diffused in the crystallized region of the semiconductor film to improve the crystallinity of the semiconductor film.

PRIOR ART REJECTIONS

The Official Action rejects claim 1 as obvious over U.S. Patent No. 5,403,772 to Zhang et al. or the Journal of Applied Physics Article written by Hultman et al. in view of U.S. Patent No. 5,278,093 to Yonehara or U.S. Patent No. 4,309,224 to Shibata. However, none of the above references disclose that a semiconductor film is irradiated with light with a catalyst being diffused in a thermally crystallized region of the semiconductor film. Therefore, this rejection is respectfully traversed, and reconsideration is requested based on the following remarks.

In view of the above rejection, claim 1 has been amended to further clarify that the invention is directed to irradiating the semiconductor film with light with the catalyst already diffused in the crystallized region of the semiconductor film. As described on page 15, lines 13-15 of the specification of the present application, the recrystallization of the semiconductor film by the light irradiation is substantially proceeded, because the catalyst, such as nickel, is diffused in the thermally crystallized region. Therefore, the Applicant has found the method of forming a semiconductor device recited in the claims of the present application to be advantageous over prior art semiconductor formation techniques. None of the cited prior art references disclose that recrystallization of the semiconductor film is easily proceeded by the light irradiation with a catalyst being diffused in the thermally crystallized region of the semiconductor film, and there is further no motivation within the

cited prior art references to irradiate the catalyst diffused crystallized region to promote recrystallization. The Yonehara reference merely discloses that grain size is increased by lamp irradiation. "[D]ecomposing an invention into its constituent elements, finding each element in the prior art, and then claiming that it is easy to reassemble these elements into the invention is a forbidden *ex post* analysis. . . . Unless the prior art *itself* suggests the particular combination, it does not show that the actual invention was obvious or anticipated." *In re Mahurkar Patent Litigation*, 28 U.S.P.Q.2d 1801, 1817 (N.D. Ill. 1993) (citing *In re Fritch*, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992)). Accordingly, the Applicant submits that the method taught by the claimed invention is not obvious in view of the cited references, and reconsideration is respectfully requested.

OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

The Official Action rejects claim 1 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 5 of co-pending application Serial No. 08/391,580. The Official Action admits that the claims of the two applications are not identical, but asserts that they are not patentably distinct from each other because a catalyst layer applied from a solution is continuous. However, claim 1, as amended above, recites that a continuous layer of material including a catalyst is formed onto at least a portion of the semiconductor film, and heating the semiconductor film with the continuous layer being in contact with the portion of the semiconductor film in order to crystallize a region of the semiconductor film around the portion. This feature is not claimed in the claims of co-pending application

Serial No. 08/391,580, nor is this feature an obvious variation of the claims of co-pending application Serial No. 08/391,580. As stated in *General Foods Corp. v. Studiengesellschaft Kohle mbh*, the first question in an obviousness-type double patenting rejection is: Is the same invention being claimed twice? If the answer to that is no, a second question must be asked: Does any claim in the application define merely an obvious variation of an invention claimed in the patent asserted as supporting double patenting? If the answer to that question is no, there is no double patenting . . . If the rejected claim defines more than an obvious variation, it is *patentably distinct*." 972 F.2d 1272, 1278, 23 U.S.P.Q.2d 1839, 1843 (Fed. Cir. 1992). In view of the above amendments, the same invention is not claimed twice and amended claim 1 is more than an obvious variation of co-pending application Serial No. 08/391,580. Accordingly, reconsideration of the double patenting rejection in view of the above amendments is respectfully requested.

CONCLUSION

In each case, the pending rejections should be reconsidered in view of the amendments and remarks herein. Applicants believe that this case is in good condition for allowance, and a Notice of Allowance is earnestly solicited. If a telephone or further personal conference would be helpful, the Examiner

is invited to call the undersigned, who will cooperate in any appropriate manner to advance prosecution.

Respectfully submitted,


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